Block 1-1

Hand in Getting to Know You - pick up units and traffic worksheet.
Notes:
What is physics?
Measurement
Traffic activity
next class: precision and accuracy

What is Physics?

Lots of stuff.
Quantum - bundle of energy - Bohr model electrons are at specific energy levels.
math - equations
Fundamental physical laws of nature.
problem solving

Definition:
Study of matter and energy(forces cause changes in energy)

Physics is an experimental way of knowing. All theories are tested through experiment or observation.

All observation involves measurements - compare the observation to a standard.

Standard units in the metric system, SI units:

base	derived
metre	centimetre, kilometre
litre	equivalent to a decimetre cubed, 1/1000 of a metre cubed
kilogram	gram, centrigram
second	milisecond, nanosecond, hour, year,

prefixes	power
deci, d	10^{-1}
centi, c	10^{-2}
milli, m	10^{-3}
mico, μ	10^{-6}
nano, n	10^{-9}
pica, p	10^{-12}
femto, f	10^{-15}

deca, D	10^{1}
hecta, h	10^{2}
kilo, k	10^{3}
Mega, M	10^{6}
Giga, G	10^{9}
Tera, T	10^{12}
Peta, P	10^{15}

Converting units:

technique: multiply by a unit fraction - top and bottom are equivalent and one of the units cancels out.

eg. distance to hope is 200km. convert into a) m b) nm c) light years]

a)

200 km (1000 m/ 1km) = 200 000m

$2 \times 10^2 = 200$

b) 200 000m (10^9 nm/1m) = 2×10^{14}nm

c) light year = the distance light travels in a year

d = vt = 300 000 000 m/s x 1 year (365.25 days/year)(24h/1day)(60minutes/h)(60s/min)

= 3 exp 8 x 365.25 x 24 x 60 x 60 =

$=9.46 \times 10^{15}$m in one light year

200 000 m x (1 light year /9.46×10^{15} m)

$=2.11 \times 10^{-11}$ light years

Block 1-2

Hand in Getting to Know You - pick up units and

traffic worksheet.
Notes:
What is physics?
Measurement
Traffic activity
next class: precision and accuracy

What is physics?
gravity
circuits
time
force
waves
acceleration
definition:
The fundamental physical laws of nature.
The process of studying matter and energy(forces cause changes in energy).
Theories are tested experimentally and with observation.

Observation is aided by measurement - observe relative to a standard value. Use a set ruler.

Metric System, SI system

Base unit	Derived units
metre	kilometre, centimeter, light year,
litre	1/1000 of a metre cubed, or 1000 cm^3
kilogram	gram,
seconds	nanosecond,
lots more	

prefixes	value
femto, f	10^{-15}
pico, p	10^{-12}
nano, n	10^{-9}
micro, μ	10^{-6}
milli, m	10^{-3}
centi, c	10^{-2}
deci, d	10^{-1}
unit	10^{0}
deca, D	10^{1}
hecto, h	10^{2}
kilo, k	10^{3}
Mega, M	10^{6}
Giga, G	10^{9}
Tera, T	10^{12}
Peta, P	10^{15}

unit conversion,

technique for more complicated unit conversions: multiply by a unit fraction and cancel the unwanted unit.

eg. convert 200 km into
a) m b) nm c) light years

a) 200 km (1000 m/km) = 200 000 m

b) 200 000 m (1nm/10^{-9}m) = 2 x 10^{14} nm

$2 \times 10^{5} \times 10^{9} =$

c) light year is the distance light travels in a year
d = vt (no acceleration)

d= 300 000 000 m/s x 1 year (365.25 d/y)(24h/d)(60min/h)(60s/min)

3 exp 8 x 365.25 x 24 x 60 x 60
or EE button or E button

$= 9.46 \times 10^{15}$ m